

REMARKS

This is intended as a full and complete response to the Office Action dated June 18, 2003, having a shortened statutory period for response set to expire on September 18, 2003. Claims 1-18 are pending in the application. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-7, 9, 11-15 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Porter* (U.S. Patent 6,239,433). The Examiner states *Porter* discloses an apparatus and method for generating an image of the infrared radiation emitted from a particular viewing region, in order to detect the presence of a flame or fire in that region and to actuate an alarm system when the characteristics of the fire or flame are not consistent with the predetermined conditions.

Applicant respectfully traverses the rejection. *Porter* discloses the ideal system for detecting a flame in a viewed area with maximum effectiveness for discerning between a flame and another hot object in the viewed area, and does this using two arrays by working on a pixel to pixel cluster to cluster basis, thereby enabling it to analyze several sources very accurately. More particularly, in the *Porter* reference, a spectral ratio measurement is taken for each element of the array, which ratio is a measurement of the radiation in the 4.3 micrometer waveband instant on each of the array elements compared with the total radiation detected by the second detector, and this measurement is different to that which is carried out by the present invention. The present invention, in contrast, uses just one array and at least one volumetric sensor to monitor a scanned region for a flame in a manner which enables reliable detection even in the presence of interfering false alarm radiation sources, in a manner which is certainly not disclosed in prior art reference *Porter*, and offers the advantages thereof of providing a reliable system in a much more cost effective manner. In this respect *Porter* fails to disclose the use of a single array in conjunction with at least one volumetric sensor. Therefore, *Porter* does not teach, show, or suggest a flame detection apparatus comprising means for generating an image of the infra-red radiation emitted within a viewing region, means for measuring the spectral ratio of the intensity of radiation having a first wavelength emitted within the viewing region to the intensity of radiation having a second wavelength emitted within the region, and processing means which analysis the

outputs of said image generating and spectral ratio measuring means for responses indicative of the presence of a flame, as recited in claims 1-7, 9, 11-12.

Furthermore, *Porter* does not teach, show, or suggest a method of detecting a flame comprising the steps of measuring the intensity of radiation having a first wavelength within a monitored region, measuring the intensity of radiation having a second wavelength within the monitored region, calculating the spectral ratio of the intensity of the radiation having the first wavelength to the intensity of the radiation having the second wavelength and comparing it to a predefined threshold value indicative of the presence of a flame, generating an image of the infra-red radiation within the monitored region, analyzing the image for features indicative of the presence of a flame within the monitored region, and activating an alarm if the results of a spectral ratio analysis and the image analysis fit a predefined profile indicative of the presence of a flame, as recited in claims 13-15. Therefore, Applicant believes claims 1-7, 9, 11-15 are in condition for allowance, and respectfully requests allowance of the same.

Claims 1-11 and 13-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Porter* and further in view of *Nakauchi, et al.* (U.S. Patent 4,179,606). The Examiner states that *Porter* discloses the measuring of the intensities from the object in the viewing area and the process of comparing these two intensities to prove the presence of the flame. Further, the Examiner states that though it is inherent that comparison of values means taking a ratio of the values in order to avoid any misunderstanding, the second reference *Nakauchi, et al.* is used to provide the conventional method of comparing two intensity values obtained in a flame detector.

Applicant respectfully traverses the rejection. As discussed in a previous paragraph, *Porter* discloses a sensor for identifying events within a scene. *Nakauchi, et al.* is concerned with a flame sensor which operates by monitoring the radiation in two different wavelength bands within a region, and comparing their ratio in order to detect the presence of a flame in the monitored region. In particular, *Nakauchi, et al.* is concerned with an apparatus which enables such monitoring of dual wavebands to be achieved using just a single sensor by providing a rotary disc having two sets of band pass filters in front of the single sensor for measuring intensity of radiations having passed the band pass filter. Processing circuitry is then provided which calculates the ratio of the measured values to produce a spectral

ratio measurement. *Nakauchi, et al.* merely teaches a mechanical system for enabling processing of radiation emissions in two different wavelength bands by a single sensor in order to calculate a spectral ratio for the radiation emission within the viewed area. However, as already stated above, Applicant is not seeking to patent multi wavelength flame detection methods which are well documented in the prior art, *Nakauchi, et al.*, representing merely one mechanical system for taking such dual measurements. Indeed, multi wavelength sensing is an embedded part of all modern flame sensors. The difficulty to be overcome when starting from *Nakauchi, et al.* is to provide a cost effective system for handling several different radiation sources at the same time, and *Nakauchi, et al.* certainly does not provide anything which, when combined by the skilled person, with the teaching of *Porter*, would lead the skilled person to arrive at the present invention without the application of inventive thought. Indeed, the very fact that the Examiner has failed to find a document which discloses the combination of concepts which have led to the invention as now defined in claim 1, despite the clear financial and technical advantages offered thereby, is evidence in itself of the inventiveness of the present application. In view of this, it is contended that claim 1 as it stands at present is both novel and inventive over the cited prior art, and hence no amendment is required thereby in view of the references relied upon by the Examiner. In this respect, therefore, Applicant believes claims 1-11 and 13-15 are in condition for allowance, and respectfully requests allowance of the same.

Claims 16 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Porter* and further in view of *Ganeshan* (U.S. Patent 6,278,374).

Applicant respectfully traverses the rejection. Claims 16 and 18 are dependent upon independent claim 13, which as previously stated is not anticipated by the references cited by the Examiner. Therefore, Applicant believes claims 16 and 18 are in condition for allowance, and respectfully requests allowance of the same.

Claims 12 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Porter* and further in view of *Castleman* (U.S. Patent 6,518,574).

Applicant respectfully traverses the rejection. Claims 12 and 17 are dependent upon independent claim 1 and claim 13, which as previously stated are not anticipated by the references cited by the Examiner. Therefore, Applicant believes

claims 12 and 17 are in condition for allowance, and respectfully requests allowance of the same.

The abstract of the disclosure stands objected to due to informalities. Accordingly, Applicant has amended the abstract and respectfully requests the objection be removed.

Claims 1-18 stand objected to due to informalities. In response, Applicant has amended the claims in accordance to the comments by the Examiner. Therefore, Applicant respectfully requests the objection be removed.

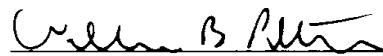
Claims 13-18 stand rejected under 35 U.S.C. § 112, second paragraph. In response, Applicant has amended the claims and respectfully requests the objection be removed.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicant's disclosure than the primary references cited in the office action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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